

TITLE: SYSTEM AND METHOD FOR SOFTWARE-PIPELINING OF LOOPS WITH SPARSE MATRIX ROUTINES

. INVENTORS NAME: Kalyan Muthukumar et al.

SERIAL NO.: 10/612724

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TRANSFORM SPARSE ARRAY MATRIX CODE TO PERFORM
RUN TIME DEPENDENCY CHECK

SOFTWARE-PIPELINE THE TRANSFORMED SPARSE ARRAY MATRIX CODE

Fig. 1

200 510 FORM A PREDETERMINED NUMBER OF VARIABLES BASED ON A VIRTUAL UNROLLING FACTOR M <u>_</u>550 INITIALIZE THE FORMED PREDETERMINED NUMBER OF VARIABLES BY CREATING VARIABLES b0, b1, ... bM-1 AND a0, a1, ... a M-1 AND INITIALIZING 60, 61, ... 6M-1 TO AN ILLEGAL VALUE FOR THE b ARRAY, SAY TO -1 <u>5</u>30 LOAD PRIOR COMPUTED VALUES SUCH THAT b[i] IS LOADED INTO THE VARIABLE BM AND THE VALUE OF C[i] IS LOADED INTO THE VARIABLE cM 240 ASSIGN THE PRIOR COMPUTED VALUES, INSIDE THE LOOP BODY, TO A PREDETERMINED NUMBER OF REGISTERS

Fig.2

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300

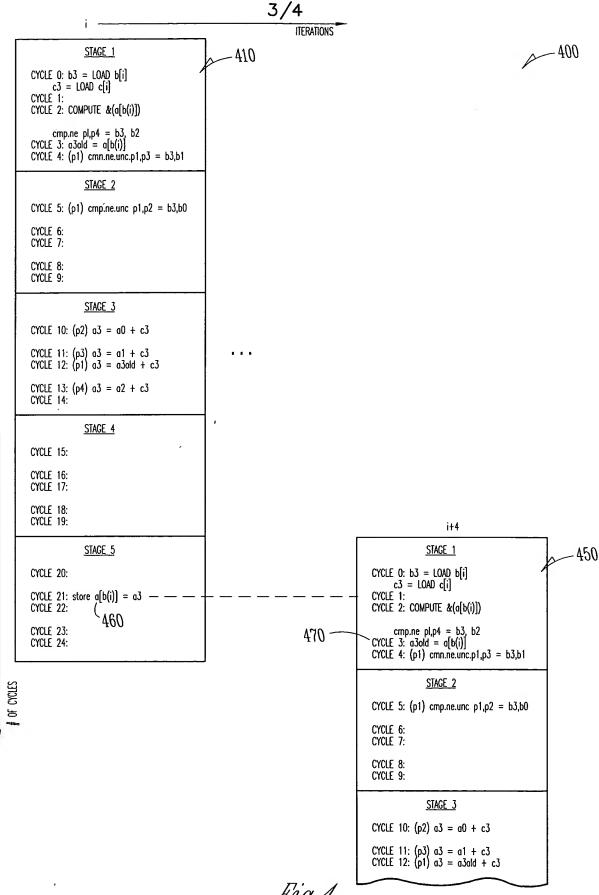
310		
	UNPIPELI	NED (17 CYCLES PER ITERATION) 0123456789012345678901234567890123456788901234567890123456789 LS LS LS
350	UNROLLED TIME >	L (9 CYLES PER ITERATION) 01234567890123456789012345678901234567890 L
<i>330</i>	~	LS LS LS PIPELINED (5 CYLES PER ITERATION) 01234567890123456789012345678901234567890123456789
	ITER01: ITER02: ITER03: ITER04: ITER05: ITER06:	LS LS LS LS LS LS LS LS

Fig. 3

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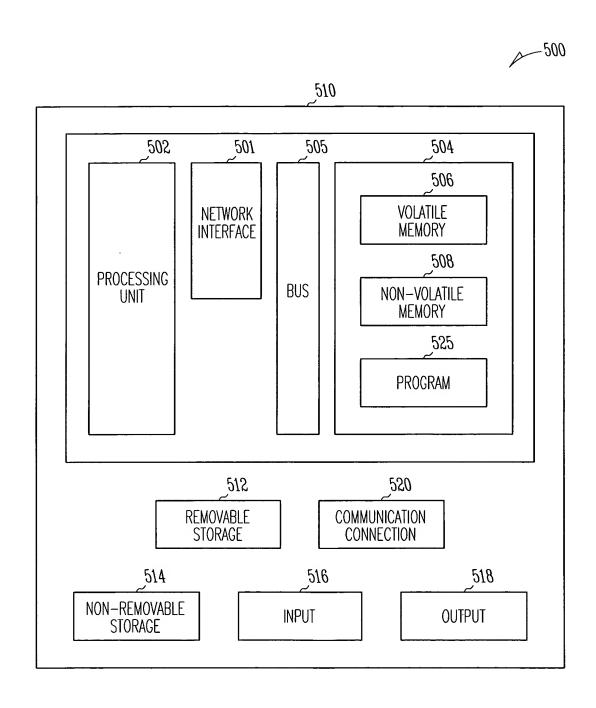


Fig. 5